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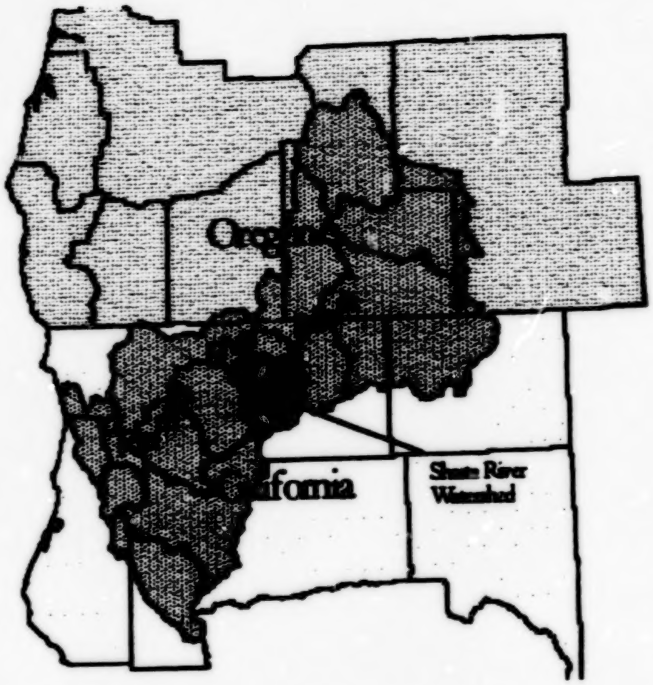
Final Report
Shasta River CRMP Coordinator, 2000



Great Northern Corp.
PO Box 20
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June, 2001

Cooperative Agreement 14-48-11333-00-G012
Project Number 2000-PC-10

2002-010270/NF

Abstract: Summary of efforts and accomplishments of person employed in the part time staff position for Coordinated Resources Management and Planning (CRMP) group working on salmonid and water quality issues in the Shasta Valley in Northern California during 2000.

2000 included community outreach, ongoing meetings with landowners, agencies and political figures, preparation of materials for inclusion in the Klamath Resource Information System (KRIS) program, fish screen fabrication, Internet access to real time flow data, and the preparation and oversight of restoration projects.

Introduction:

The Shasta River Coordinated Resources Management and Planning group (CRMP) was started in mid-1991, through the combined efforts of several members of the ranching community, the Siskiyou RCD, and the Natural Resources Conservation Service (then Soil Conservation Service). At that time there was no similar organization in Siskiyou County, and the prospect of developing a good working relationship amongst the various landowners and agencies seemed unlikely.

Given the magnitude of the task undertaken—to restore the productivity of the Shasta, while maintaining a healthy local agricultural economy—it was clear that efforts beyond what a volunteer group was capable of were required. Recognizing this, the Klamath River Basin Fisheries Task Force provided funding in FY 1992 for a part time Projects Coordinator to assist the CRMP in progressing from discussion, self-education and planning to project implementation, grant funding and community outreach.

That funding has been renewed at varying levels in FY 1993, 1995, 1996, 1997, 1998, 1999, 2000, and 2001. Partial supplemental funding was made available through a grant from the Calif. DFG for 2000 and 2001.

Description of Study Area:

The Shasta River and its major tributaries are part of the Klamath Basin (see map on cover), and total hundreds of miles in length, draining an area of approximately 800 square miles.

They flow almost entirely through relatively small parcels of private ranch land. To be effective, any activity aimed at improving water quality for fish or human needs must be done with the active help and participation of a large number of individual owners whose needs, desires and financial conditions vary greatly.

Each of these ranchers has long-standing cultural practices, many of which depend on the river, including irrigation of pasture and hay fields, grazing of riparian areas, and watering of livestock. All of these activities can have a substantial impact on water quantity and quality.

Historically the Shasta River was an important spawning and rearing area for chinook and coho salmon, and steelhead. Records of fall chinook spawners kept since the 1930's show a long decline, from over 80,000 in 1931 to as few as 530 in 1992. Since 1992, numbers have climbed to as high as 13,000. steelhead and coho are likewise no longer present in significant numbers, although actual counts are not available.

Over the last ten years there has been an extensive program of water testing in the Shasta. Results indicate significant problems for cold water fish resulting from high water temperatures and low levels of dissolved oxygen. Additional fieldwork indicates severe problems of fine sedimentation. Other observed but less well documented problems include: blockage of coarse sediment by dams, groundwater withdrawals capable of affecting surface flows, high nutrient levels and consequent turbidity caused by free-floating algae.

The Shasta CRMP coordinator is charged with developing responses to these problems, helping landowners to embrace solutions, securing funding to pay for part or all of the changes proposed, and supervising project implementation.

Methods and Materials:

The Shasta CRMP serves generally as a broad oversight body, with the details of implementation of its goals left to the project coordinator. The coordinator works with individual CRMP members, agencies, and other groups and individuals to develop and implement specific actions that will further the CRMP's goals. In addition, the CRMP Coordinator must be available to respond to requests for assistance from the USFWS, TWG and Task Force, along with state agencies (including DFG and DWR), schools, and other restoration workers.

Information transfer and reporting is frequently accomplished verbally at CRMP meetings or to individuals, in written form in newsletters and agendas, electronically via email, and photographically. Most residents of the Shasta Valley do not make routine use of computers, so mailings and verbal reporting is the most effective way to communicate with them. Agencies and persons engaged in restoration planning generally all have ready access to computers and the Internet, making electronic data and document transfer their preferred method.

Project documentation has been done using photographs and slides, some of which have also been scanned for use electronically on the Internet or in the KRIS.

Post project monitoring and documentation, and responding to needs and opportunities as they arise can require almost anything by way of methods and materials. An engineering autolevel, steel T posts, hacksaw and post driver are used in setting up stream cross section profile locations; Arcview software, plotter and laptop computer were needed to prepare the presentations, temperature measuring devices were placed in streams then downloaded for future use, dissolved oxygen meters were utilized in water quality monitoring, etc.

Results and discussion of accomplishments:

Successfully meeting the overarching goal of this grant--assisting the Shasta CRMP to continue to make substantial steps towards restoring the Shasta River for salmonids--required a variety of approaches. General activities included:

Coordination of fieldwork, both paid and volunteer
Meeting with interested parties, both individually and in groups,
Assisting with planning both within the Shasta Watershed and elsewhere in the Klamath Basin,

Meeting with Task Force and its technical work group,
Responding to problems and opportunities as they arose

This grant included a number of defined tasks to be completed, and specific work products, each of which will be described separately below, followed by a description of some of the more important unexpected opportunities that arose and were acted upon:

Task 1—Evaluate changes over time in instream water temperatures to use in prioritizing CRMP projects.

CRMP Coordinator assembled all available temperature data (Provided to USFWS on disk. Search for data spanned 1900 through the present. Actual range of data spanned 1950 through the present, although everything prior to 1965 was only available in the form of individual grab samples. All data that was not available in electronic form was entered into spreadsheets. In addition, all recent (1994-mid-2000) data was assembled into annual data-sets for each location where data had been collected, checked for validity, outliers removed, and the entire set prepared for inclusion into KRIS (see attachment 1).

Task 2—Make complete historical record accessible via KRIS.

While the temperature data was assembled and cleaned up so that it could be included into KRIS, the data search, data entry and clean-up extended beyond the date for submittal to the soon-to-be-released version of KRIS. USFWS will be able to include it into the next published version. Maps were prepared showing locations of current and historic temperature collection locations to be used with numeric data.

Task 3—Provide information to landowners regarding river conditions past and present.

Coordinator prepared a preliminary report for CRMP on the trends apparent in key sections of the temperature data, along with comparisons to flows and fall chinook spawner numbers. Presentation was made of dissolved oxygen data that was collected through the summer of 2000 at a CRMP meeting in the fall of 2000, along with comparisons to available historic data. Data was discussed in informal meetings with landowners periodically through the year. CRMP also maintained its telephone accessible monitoring station to provide real time access to flow and temperature data in the Shasta. Other information was presented in an ongoing and informal maner.

Task 4—Develop restoration projects for the Shasta River.

Approximately 24 funding proposals were prepared for a variety of projects and submitted to the DFG, TF and ERO. These included funding requests for additional outreach, coarse and fine sediment studies, flow studies, fencing, etc. Funding opportunities used as springboard to re-energize urban residents in Yreka area in Yreka Creek Watershed. Prepared two funding requests focused on Yreka Creek; Initiated contacts with city of Montague regarding wastewater enrichment of Oregon Slough and possible solutions. Postponed preparing urban impacts section to Shasta Plan pending completion of major improvements underway by cities of Weed, Yreka and Montague.

Task 5—Expand and improve Shasta Watershed Restoration Plan

New material was prepared for inclusion in the next re-write of the watershed plan on water use in the Shasta Valley. That section included discussion of irrigation methods, value of water, flow gaging locations and histories, map of diversion points, and an overview of water law and specific details of the Shasta River Adjudication.

Additional material was prepared examining changes in temperature over time in the Shasta Valley. Funds were secured from the Task Force to be used for re-writing the plan in 2001where the above information will be incorporated.

A GIS map layer was prepared outlining all of the 13,000 assessors parcels in the Shasta Valley outside of city limits, along with landowners names and addresses, and key parcel information (see attachment 2).

Task 6—Provide a link between the Shasta CRMP, KRBFTF, and other restoration workers.

CRMP personnel provided tours of the Shasta Valley to persons interested in fisheries restoration (see attachment 3, TWG tour stops), provided written advice to the Scott Watershed group as it went through re-formation, reported to the Task Force on work in progress, and met regularly with the TWG. In addition, the Shasta CRMP Coordinator attended the Salmonid Restoration Federation conference and networked with other restoration workers throughout the state.

In addition, the Shasta CRMP Coordinator spent considerable time working on a variety of issues with the Siskiyou County Natural Resources Planner helping him to better understand the recent historical context of events throughout the Klamath Basin, and also to brainstorm on possible successful approaches to the many water related problems faced by residents of the county.

We were also able to act as hosts to a grad. student class on Natural Resources Issues from Southern Oregon University, taking them to private ranch lands in the Shasta Valley, looking at typical projects, and discussing the competing needs for land and water with landowners.

We also provided the local point of contact and acted as tour guide for the tribal Salmon Camp students from the Hoopa, Yurok and Karuk tribes.

We also volunteered to provide a tour for persons attending the Fall Task Force meeting, where we were able to visit the Fiock Ranch, look at the dam removal project, exclusion fencing, tree planting, spawning salmon (first time on this site in the Fiocks' memory), and talk about challenges throughout the Shasta Valley.

Task 9—Complete one biannual Report and one final Report to the Yreka FWO and 18 copies to provide to the TF members.

Biannual report was submitted in mid-year. This report constitutes the Final Report.

Specific Work Products:

1. Assemble and enter all water temp data into electronic spreadsheet—done and delivered to the USFWS. See tasks 1 and 2. Data sought from 1900 through the present. Data found from 1950 through the present—see attachment 1.

2. Analyze temperature data sets for evidence of changes over time—Report produced and separately submitted—contact USFWS office in Yreka for copies.

3. GIS map of historic temperature sampling locations—completed and attached-- see attachment 2.

4. Continue operation of real time temperature monitoring station—operated through the entire year. Collected data on water temperature, conductivity, flow, and temperature. Gathered air temp., and solar intensity also.

5. Quarterly newsletters and expand mailing list—produced only three newsletters; added all members of all 4 irrigation districts (Grenada, Big Springs, Shasta Water Assoc., and Montague Irrigation Dist.) to our mailing list, along with several individuals who were interested.

6. Re-contact landowners--Contacted landowners throughout the Shasta Valley. Contacts resulted in several livestock exclusion projects, particularly on the Little Shasta River. Contacts also enabled us to help DWR to establish water quality sampling sites throughout the Shasta Valley to collect data to be used to help landowners formulate effective measures to improve water quality.

7. Funding requests—produced over 24 funding requests for a variety of restoration oriented tasks, including coarse and fine sediment budgeting.

8. Riparian lands--made informal inquiries regarding cost of identifying riparian parcels, but was unable to allocate time to fully developing a formal estimate of cost. Did complete preparation of parcel ownership map base which would serve as foundation for this task—see attachment 2.

9. Expand active area of CRMP to include urban areas—re-invigorated Yreka Greenway Committee; successfully encouraged them to take on interest in entire Yreka Watershed; worked with Yreka City Manager to re-involve Yreka, met with consultants working on revising Yreka General Plan to make suggestions for including provisions for future Yreka Creek oriented expansion and improvements. Wrote several grants targeting Yreka for focused assistance on fisheries and water issues. Met with city engineer to introduce him to fisheries issues, and pave the way for future collaboration.

   Worked indirectly with City of Montague to try to resolve problem of periodic overloading of sewage treatment facility, and subsequent release of secondarily treated sewage into the Shasta. Helped prepare plans for expanded area for land disposal of liquid during the summer; Worked through Great Northern Corp to secure for Montague a grant to investigate and begin repairs needed to eliminate infiltration into sewage system.

   Helped DWR begin water quality study as way to gather data on Shasta River above Dwinnell as preamble to working with Weed on water quality issues once they are defined. Met with interested landowners in upper Shasta to begin building group of people interested in making water quality improvements.

10. Water usage document—Prepared and submitted water usage and irrigation report separately to USFWS—contact USFWS office in Yreka for copies.

11. Environmental Baseline Matrix preparation—This effort is still in progress, but nearly complete. Volunteer committee formed to work on it consisting of DFG and USFWS biologists with

working familiarity of the watershed, along with Mike Deas, Jim DePree, and CRMP Coordinator. Assistance provided by HSU. Work demands, particularly on the committee chairman, have kept us from completion of this task. Anticipate one to two additional meetings required, to be followed by final write-up.

12 GIS map of assessor's parcels—complete for all parcels outside of the city limits of Weed, Montague and Yreka. Parcels linked to ownership data—see attachment 2.

13. Meet with TF and TWG—met several times with these groups; prepared written materials to assist them in their understanding of the basin—see attachments 3a and b.

Highlights of the Year:

Shasta CRMP coordinator partnered with an exceptional DFG biologist to finish design and fabrication of two fish screens for use in sites where existing available designs would not work. These two screens on the Lemos and Fiock ranches were completed in time for the start of irrigation in April. The Fiock screen in particular was significant in that it is the culmination of a multi-year effort to permanently remove an irrigation diversion dam that has been seasonally used since 1889, and had contributed to water quality and fish problems ever since.

We continued to refine and test a third innovative fish screen design for a baffled tube screen which has been performing reliably for several seasons. We plan to eventually publish the design details to allow other restoration workers to copy it.

We were able to secure the donation of a dissolved oxygen meter through the county Fish and Game Commission, and put together a major volunteer effort to collect pre-dawn dissolved oxygen data from 4 sites in the Shasta twice per week from May through October, greatly adding to our knowledge base of the fluctuations occurring in water quality, and moving us closer towards developing approaches to meeting TMDL schedules to be determined by 2005—see attachment 4.

A major step forward was the selection of a restoration project on the Shasta River for inclusion in the annual Siskiyou County Cattlemen's tour, where we were able to present photos and discussion on efforts made, changes over time, and possible costs and benefits to the landowner.

Finally, we were able to work with DWR to initiate an intensive two year water quality monitoring program throughout the Shasta Valley focusing on bracketing source areas, and ultimately developing recommendations and suggestions on where and how to address sources of water quality problems.

Volunteer Contributions:

A water quality data collection effort was the main volunteer project for this year, involving hand collection of pre-dawn dissolved oxygen data the length of the agricultural portions of the Shasta Valley from May until October. Other volunteer efforts involved the collection of temperature data, stream cross section data, the preparation and growing of rooted tree cuttings for later planting, general basin wide planning, project oversight and program leadership. Estimated value of volunteer donations approximately $16,000.

Summary and Conclusions:

As is occurring in many other watersheds throughout the state, restoration progress continues to be made. The Shasta continues to be an important producer of salmon, as evidenced by the spawner return of fall chinook of over 11,000 salmon in 2000. The need for substantial improvement continues, particularly in the form of provision for assured instream flows and temperatures, especially in low-water years. The slow workings of the ESA for coho, and the Clean Water Act for TMDLs gives the appearance to many of limitless time, but at the pace we are moving, we will not be where we need to be before each of those legislative initiatives have a substantial impact. Lack of funding for outreach and project development continues to restrict the rate of improvement to be found in the Shasta.

Funding by the Klamath River Basin Fishery Task Force continues to by the most long-standing and reliable assurance of continued restoration progress; competing demands for Task Force funds throughout the Klamath Basin severely limits that group's ability to fully fund outreach efforts anywhere in the Klamath Basin, but without their vision and ongoing support little would have been accomplished to date. Supplemental funding is now becoming available from other sources, raising the hope of improving the rate of change.

Summary of Expenditures, CRMP 2000

Salary:	$25,530
Travel	1,088
Materials	1252
Operating Expenses	3,696
General Administration	3,157
Total	$34,722

Cost Share and matching funds:

Volunteer time contributions: $16,000+

Shasta River Temperature Data compilation through October 2000

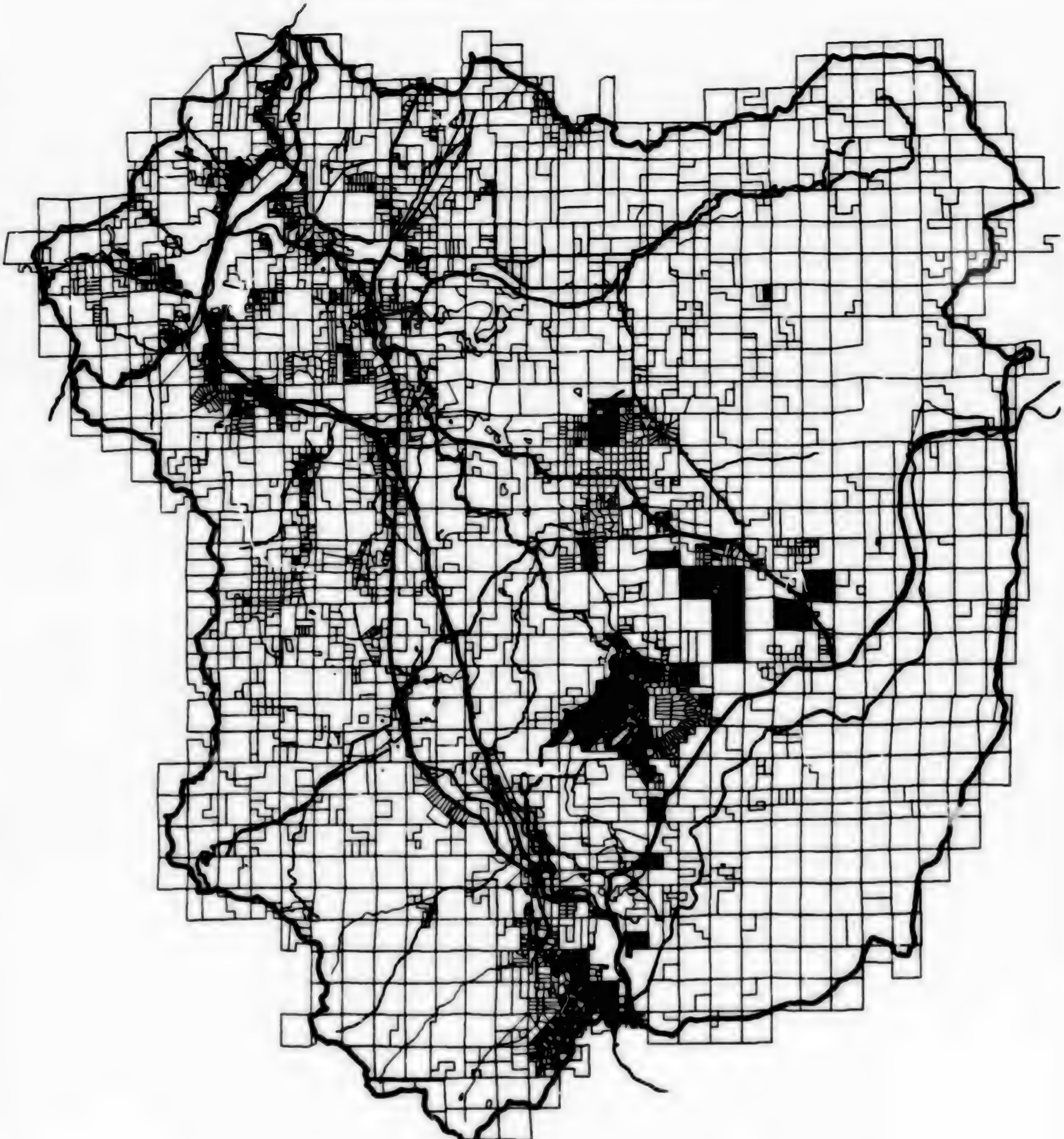
Attachment 1

Site	year	extent	problems/fixes
Anderson Grade Rd	1994	6/28 to 11/22	First data point of each day deleted as the previous day's date was associated with it.
Anderson Grade Rd	1995	3/6 to 11/21	Deleted 13 day block in August.
Anderson Grade Rd	1996	3/21 to 10/20	Block deleted at 5/21
Anderson Grade Rd	1997	3/11 to 11/10	time shifts at 7/4 to 8/4--fixed
Anderson Grade Rd	1998	4/10 to 11/4	none
Anderson Grade Rd	1999	8/18 to 12/31	none
Anderson Grade Rd	2000	1/1/00 to 10/22/00	Deleted block of data at 3/22.
Big Springs	1994	3/15 to 6/15	Had incorrect start time and date. Assigned start date based on field/data notes, assigned start time based on a best fit to expected diurnal patterns observed in other data sets for Shasta R.
DWR Weir / Montague Grenada Rd	1993	6/9 to 6/25	No time recorded. Was able to reconstruct intervals and start times based on records of other sites.
DWR Weir / Montague Grenada Rd	1994	7/15 to 11/22	Deleted data at front and end.
DWR Weir / Montague Grenada Rd	1995	6/6 to 11/21	Deleted block at 8/21 and other minor outliers.
DWR Weir / Montague Grenada Rd	1996	3/20 to 10/18	Several small blocks deleted. Data collected on short time intervals.
DWR Weir / Montague Grenada Rd	1997	3/23 to 11/6	Deleted set at front. Time shifted 12hrs forward at 7/1 to 8/8--fixed. Block of missing data 3/21 to 5/11 and 8/18 to 9/2.
DWR Weir / Montague Grenada Rd	1998	4/10 to 11/3	No anomalies
DWR Weir / Montague Grenada Rd	1999	3/18 to 10/12	none
DWR Weir / Montague Grenada Rd	2000	3/23 to 10/31	Deleted block of data at 8/4 to 8/7.
Edgewood	1996	6/12 to 7/25	none
Edgewood at Airport	1997	6/9 to 11/5	none
Edgewood	1998	4/10 to 11/3	none
Edgewood	1999	3/18 to 12/26/99	time shifts at 8/19--fix proposed. Overlap of data, temp jump at 10/12/99
Edgewood	2000	3/26/00 to11/13/00	Outliers deleted at 3/21. No data from mid Dec to mid Mar. Spike in temp at 7/13. Greater
Grenada Irrigation Dist	1994	7/14 to 11/22	Deleted outliers at front and end.
Grenada Irrigation Dist	1995	6/6 to 11/21	Deleted data at 8/21.
Grenada Irrigation Dist	1996	3/24 to 8/5	Several spikes deleted. Block of missing temps from 4/18 to 5/21.
Grenada Irrigation Dist	1997	3/12 to 11/5	Deleted front and adjusted time after 7/1. Blank block of data 5/10 to 5/20.
Grenada Irrigation Dist	1998	5/29 to 11/3	Deleted data block from 6/22 to 6/28 as data looked "scattered."
Grenada Irrigation Dist	1999	3/18 to 10/13	none
Grenada Irrigation Dist	2000	3/23 to 5/9	broad peaks with nighttime high occur in April--no fix
Highway A-12	1993	6/9 to 6/30	No times recorded but reconstructed based on diurnal patterns of other sites of Shasta R temp data.
Highway A-12	1994	3/28 to 11/24	Adjusted start times to better reflect diurnal patterns for block 3/29 to 6/27.
Highway A-12	1995	2/28 to 11/21	Deleted data at front, 6/5 and 8/21.
Highway A-12	1996	6/6 to 10/21	Several outliers deleted. Block at end of set deleted.
Highway A-12	1997	3/21 to 11/4	anomalous peaks occurring at night--no fix; 7/4 to 8/8 data was shifted 12 hrs forward--fixed; data at front and back deleted (air temps)
Highway A-12	1998	4/10 to 11/3	anomalous peaks occurring at night during spring and fall--no fix as this is thought to be a real occurrence
Highway A-12	1999	3/17 to 10/12	none
Highway A-12	2000	1/1 to 11/1	anomalous peaks occurring at night--no fix
Highway 263	1993	6/24 to 7/15	Start dates and start times were not recorded but I was able to reconstruct based on a summary table included with the data.
Highway 263	1994	4/6 to 11/22	Adjusted the start time for block of data 4/6 to 6/28. Original data had start time of 0:00. Adjustment based on best fit to diurnal pattern.
Highway 263	1995	3/6 to 11/21	Deleted data at 6/5 and 8/21. Large daily spikes that occur from 3/17 to 4/26 not deleted.

Highway 263	1996	3/24 to 10/21	Several single spikes of temp deleted. Temp collection intervals short (12 min) during first half of year.
Highway 263	1997	3/11 to 11/5	Front and tail deleted. 7/1 to 8/4 shifted back 12 hrs.
Highway 263	1998	4/7 to 11/3	Outlier deleted at 6/7 and temps dropped lower here--no fix for temp drop.
Highway 263	1999	3/18 to 2/31	none
Highway 263	2000	1/1/00 to 10/6/00	Deleted outliers at 3/21.
Highway 3	1994	3/28 to 6/30	Adjusted the start time. Original data had start time of 0:00. Adjustment based on best fit to diurnal pattern.
Highway 3	1995	3/6 to 11/28	Deleted outliers at front, 6/5 and 8/21
Highway 3	1996	3/21 to 10/21	Several outliers deleted.
Highway 3	1997	3/21 to 11/5	Front deleted. 7/1 to 8/8 shifted back 12 hrs.
Highway 3	1998	8/18 to 11/3	No anomalies.
Highway 3	1999	3/21 to 12/31	deleted data on front
Highway 3	2000	1/1/00 to 10/31/00	Deleted outliers at 3/21. Relatively late peaks at night during October.
Hole in the Ground	1999	4/7 to 10/12	Three points at front deleted.
Louie Rd	1994	7/17 to 9/9	Deleted data at end. Data shifts to much smaller daily amplitudes in Sept--no edits.
Louie Rd	1995	5/17 to 8/15	Deleted data at front.
Louie Rd	1996	3/25 to 10/12	No anomalies.
Louie Rd	1998	4/6 to 11/4	Missing data at 6/23 to 7/5--no fix.
Louie Rd	1999	3/18 to 12/31	Deleted block at 8/8 to 8/12
Louie Rd	2000	1/1/00 to 10/31/00	Deleted outliers at 3/21.
Mouth	1994	3/30 to 12/31/94	Adjusted start times for 3/29 to 7/2 to better reflect diurnal patterns. Original start time was 0:00.Deleted outliers on 3/29 and 3/30; 9/7 and 11/22;. Data gap 7/2 through 9/30
Mouth	1995	1/1 to 12/31	Outliers deleted on 11/30. Data with large gaps
Mouth	1996	1/1/96 to 12/31/96	Outliers deleted 3/25 thru 26 and 5/20 thru 5/22; large data gaps
Mouth	1997	3/21 to 11/6	Deleted front. 7/1 to 8/4 was time shifted forward 12 hrs--fixed.
Mouth	1998	5/20 to 11/3	deleted outliers 11/3/98
Mouth	1999	3/19 to 12/31	Formatting inconsistencies not corrected
Mouth	2000	1/1/00 to 10/5/00	No anomalies.
Parks Cr	1997	6/10 to 10/31	Deleted front. 7/3 to 8/4 shifted back 12 hrs. Deleted block 7/25 to 7/28 as temps looked too low.
Parks Cr	1999	4/8 to 10/12	none
Parks Cr	2000	5/8 to 8/27	No daily variation after 8/28 therefore deleted.
Riverside	1994	3/26 to 8/30	Adjusted start times for 3/26 to 5/15 to better reflect diurnal patterns. Original start time was 0:00.
Riverside	1995	2/28 to 9/10	Deleted data at 3/20 to 3/24, 6/6 to 6/7, 8/21, and all data after 9/10. There seemed to be some problems with Hobo coming out of water...
Riverside	1996	3/22 to 6/20	Deleted few hours at front and several spikes.
Riverside	1997	6/11 to 10/31	Deleted several spiked outliers. Data were shifted in July Aug. Double peaks evident.
Riverside	1998	5/20 to 11/3	Front end deleted. Black cells deleted. Same data as Hole Riverside 1998?
Riverside	1999	3/19 to 12/26	Data at 8/18 phase shifted 24 hours back.
Riverside	2000	3/23 to 5/8/00	Outliers deleted at 3/23 and 5/8. Large block of missing data 12/26/99 to 3/16/00.
Yreka Ager Rd	1994	3/26 to 11/22	Generated start time and intervals for block 3/26 to 6/28 as no times were recorded. Based generated times on those used for other sites in 1994.
Yreka Ager Rd	1995	3/8 to 11/21	Deleted data at 6/8 and 8/21.
Yreka Ager Rd	1996	3/28 to 10/20	Deleted block at front and several outliers.
Yreka Ager Rd	1997	3/12 to 11/4	Deleted front data, blanks and outliers. Time shifted back 12 hrs at 7/1 to 8/8.
Yreka Ager Rd	1998	4/8 to 11/3	Deleted blanks, block of missing data at 5/8 to 7/22.
Yreka Ager Rd	1999	3/18 to 10/12	Outliers deleted at 6/28 and 8/18
Yreka Ager Rd	2000	3/22 to 11/1	missing block of data 5/5 to 5/9--no fix; some suggestion of nighttime peaks during April and Sept-Oct--no fix
z DWR data at mouth		1994-00	No changes attempted
zz Old USGS data at mouth		1966-1976	No changes attempted. USGS std +- 2°C. Mercury sensors easily within 1°C
zzz Old DWR data from Storet files		1950-1985	Many locations, grab samples. No corrections attempted.

Attachment 2

Shasta River Watershed
Assessors Parcels



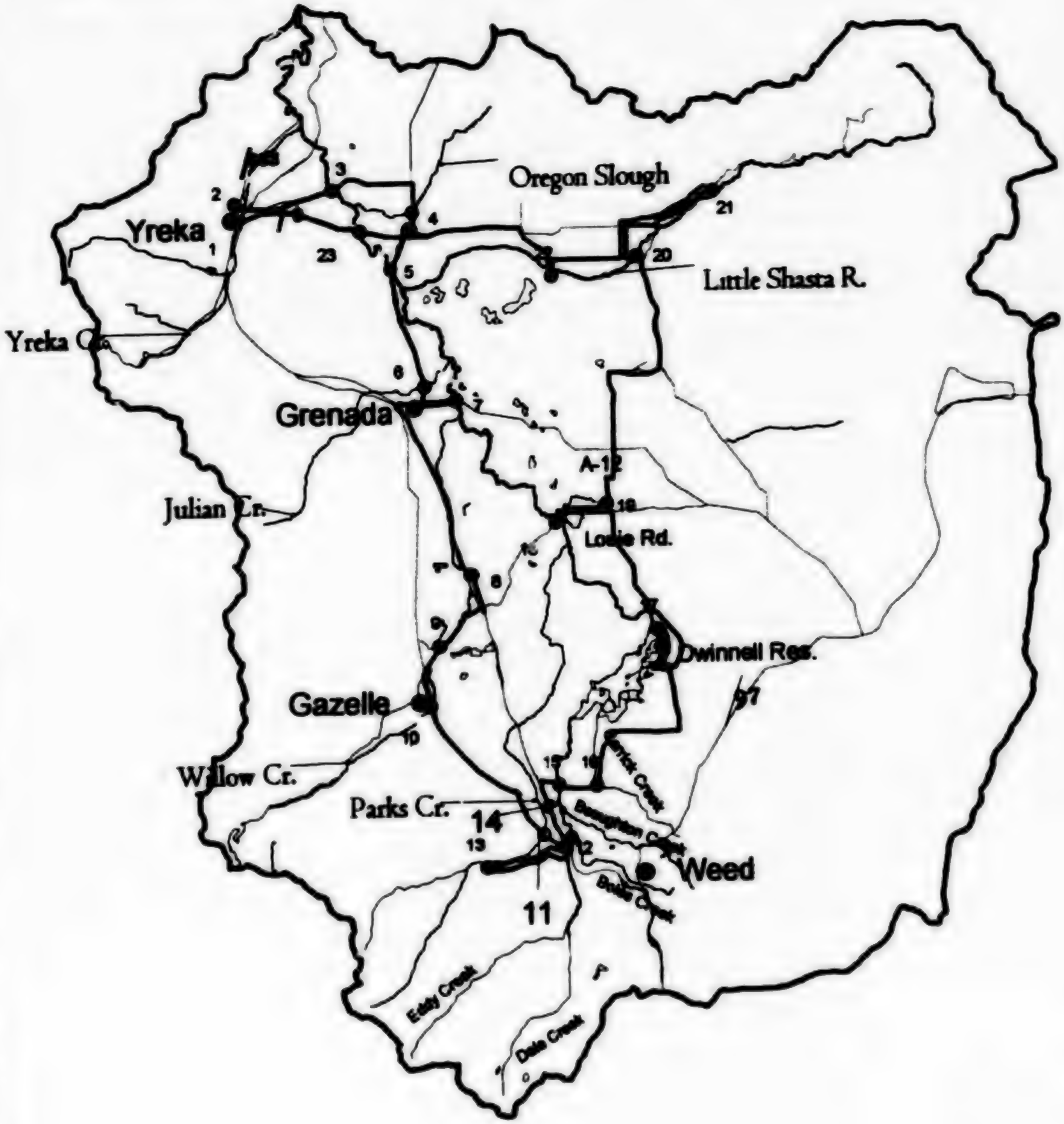
Attachment 3

Technical Workgroup Tour Stops
Shasta Watershed 2000

ID number	Location	Description
1	USFS Yreka	Start and end
2	Raley's and Yreka Creek	Lunches and redd in creek
3	Yreka-Ager Rd. BR.	Flock fences, dam, pump, mined channel
4	Oregon Slough	small stream that we crossed but did not stop at.
5	Montague Grenada Rd. Br.	Fencing, watermasters weir, 1 cfs diversion, tailwater capture
6	Julian Creek	small creek we crossed but did not stop at
7	A12 Br.	Meanders, fencing challenges, grazing intensity comparison
8	Willow Creek	Running beside Hy, first in nat. channel, then in ditch by Caltrans
9	Willow Creek	small gravel and silt bottom, low gradient channel (hunters near road)
10	Willow Creek	Open channel, large qty of spawning size granitic gravel
11	Parks Creek	Granitic gravels, small berms from channel maint, near Parks Crk Divers.
12	Shasta R & mouth of Boles Crk	Channelized, aggraded, blown-out
13	Parks Creek	Back to Upper Parks Crk via Stewart Springs Rd.
14	Parks Creek diversion canal	canal perpendicular to Hy from west to east, then dn. over hill
15	Shasta River near Edgewood	DWR gauge location, more gravel, end of COE channelization
16	Carrick Crk	small stream that we crossed but did not stop at.
17	Dwinnell Dam	Lunch, Montague Irrigation District Canal
18	Louie Rd Br.	Shasta 1/8 mile above Big Springs Creek
19	Big Springs Lake	Edge of Pluto's Cave Basalt, lava tubes, 60 cfs spring in lake
20	Little Shasta	Little Shasta R and Montague ID Canal, Volcanic gravels upstream
21	Little Shasta	Refugia area
22	Little Shasta	Fish Screen on DFG diversion from Little Shasta
23	Shasta River	Crossed but did not stop

Shasta Watershed

Topic-___Technical Workgroup tour, 2000______ Reviewer___D. Webb_________



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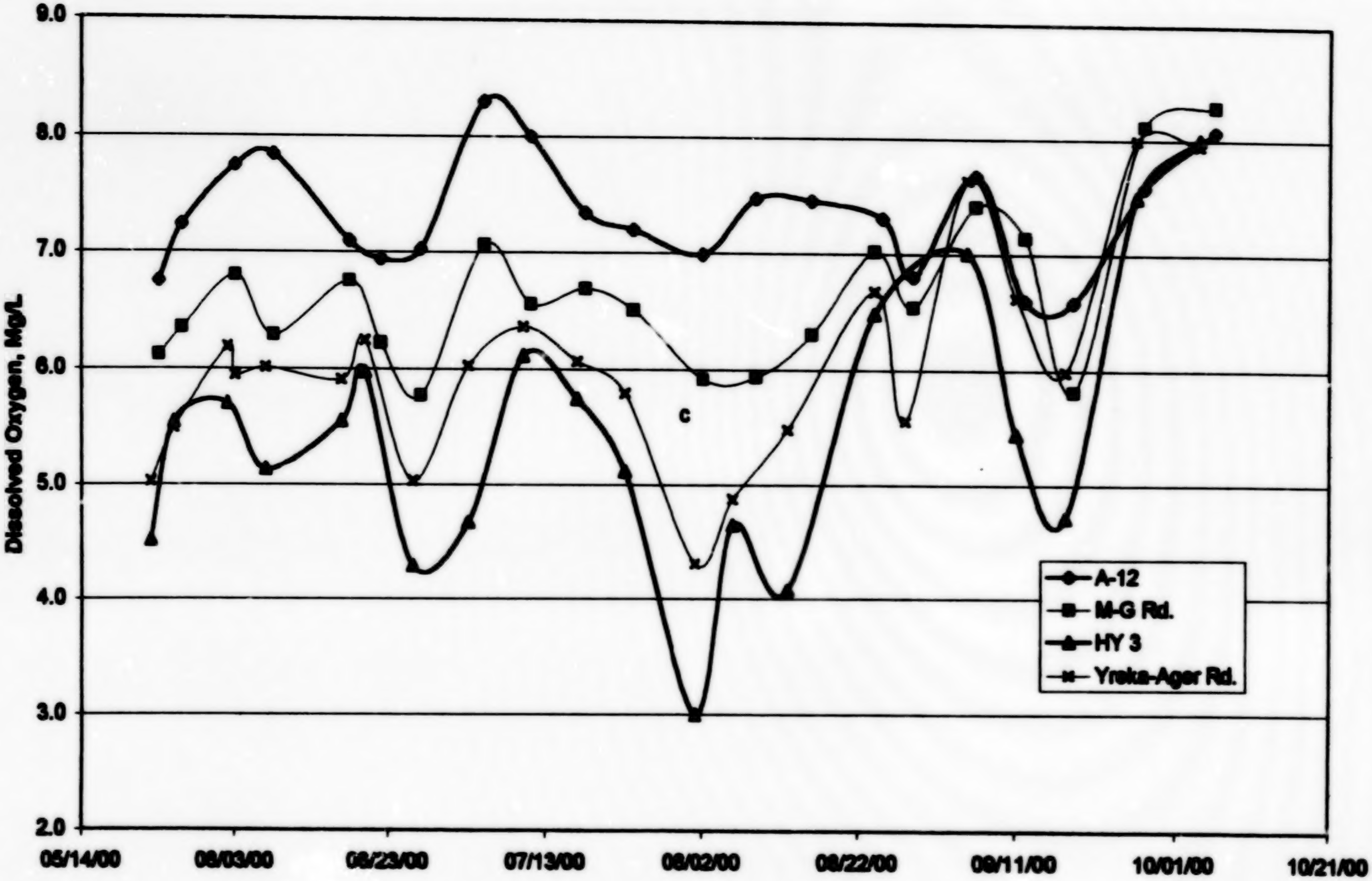
Attachment 4

Minimum Dissolved Oxygen Measurements, Shasta River 2000



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